

AMENDMENTS TO THE CLAIMS:

LISTING OF CLAIMS:

1-29. (Cancelled)

30. (New) A machine tool providing desired machining for a work by relatively moving a tool and said work, comprising:

a main shaft for installing a tool;

an electric motor provided at the shaft head, for rotating said main shaft;

an inverter circuit for driving said electric motor;

a controller for controlling said inverter circuit, and

a tool data setting means for pre-setting the magnitude of the power output of said electric motor which is suitable for the working condition of each said tool used, the desired working being done to a work piece by moving relatively said tool and said work piece, wherein

said electric motor comprises:

a stator having a primary winding, and a stator field magnet and

a rotor having a field magnet to be placed in opposition to said stator field magnet and a shaft, said field magnet comprising a first field magnet having different polarity magnetic poles sequentially arranged in a rotating direction and a second field magnet rotatable relative to said first field magnet and having different polarity magnetic poles sequentially arranged in a rotating direction, and

a shifting mechanism for shifting said second field magnet relative to said first field magnet in axial and rotating directions depending upon a balance between a magnetic action force between said first field magnet and said second field magnet and a torque generated in said rotor;

said rotor rotating in forward direction when said electric motor is driven at low speed for rotatingly driving said main shaft, and

said shifting mechanism placing magnetic pole centers of said first field magnet and said second field magnet in phase by balance of said magnetic action force between said first field magnet and said second field magnet and said torque generated in said rotor when said rotor is rotating in forward direction, and placing magnetic pole centers of said first field magnet and said second field magnet out of phase for reversal of direction of the torque generated in said rotor when said rotor is rotating in reverse direction.

31. (New) A machine tool according to claim 30, wherein said first field magnet is fixed to said shaft;

said second field magnet is provided movably relative to said shaft; and

said second field magnet and said shaft are connected by a thread function consisted of a bolt function provided in said shaft and a nut function provided in said second field magnet.

32. (New) An electric motor according to claim 32, wherein a stopper has a servomechanism capable of moving said stopper in parallel to said shaft according to a rotating speed of said motor as needed.

33. (New) An electric motor according to claim 32, wherein said stopper has a servomechanism capable of moving said stopper in parallel to said shaft according to a rotating speed of said motor as needed.

34. (New) An electric motor according to claim 30, wherein a lead angle of current supply by a controller for controlling said controller is corrected corresponding to a positional shift of a composite magnetic pole of said first field magnet and said second field magnet.

35. (New) An electric motor according to claim 30, wherein a lead angle of current supply by a controller for controlling is corrected corresponding to a positional shift angle of a composite magnetic pole of said first field magnet and said second field magnet.

36. (New) An electric motor according to claim 30, wherein a plurality of supporting mechanisms capable of guiding rotational motion and reciprocal motion and the composite motion of said second field magnet is arranged between said second field magnet and said shaft.

37. (New) A rotary electric machine according to claim 31, a sleeve is inserted between the inside of said second filed magnet and said shaft to fix said second field magnet to said sleeve, and

said sleeve is fixed on inner periphery side of said second field magnet.

38. (New) A rotary electric machine according to claim 37, wherein said sleeve is made of a non-magnetic material having an electric resistivity higher than that of iron.

39. (New) An electric motor according to claim 31, wherein a plurality of springs is arranged before and after said second field magnet to guide the rotational motion and the reciprocal motion and the composite motion of said second field magnet.

40. (New) An electric motor according to claim 31, wherein a depressed portion is formed on a side surface of said first field magnet where said first field magnet and said second field magnet are in contact with each other, a projecting portion also serving as a function of said sleeve is formed on a side surface in said second field magnet contacting with said first field magnet,

said projecting portion serves as a sleeve for electrically and magnetically isolating between said second field magnet and said shaft.

41. (New) An electric motor according to claim 32, wherein said stopper has a supporting mechanism for guiding rotational motion and reciprocal motion and the composite motion to said second field magnet and said shaft.

42. (New) An electric motor according to claim 31, wherein an air gap between said rotor having said second field magnet and said stator is larger than an air gap between the rotor having said first field magnet and said stator.

43. (New) An electric motor according to claim 33, wherein said stopper and said servo mechanism are provided inside of said second field magnet.